Increase of a company’s efficiency by implementing the computer technology Enterprise Application Integration

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Abstract: - This article describes the features and the possibility of implementing, at company-level, a new information technology, Enterprise Application Integration (EAI), which enables organizations to be able to integrate their existing applications and other systems to gain new technologies and applications from this mix.

Key-Words: - technology, platform, applications, services, interface, security, company

1 Introduction
Programming at company level has evolved greatly in recent years. In particular, this evolution is based on the Web’s existence. This allows companies to automate and integrate their business and their computerized operations, as well.

Very quickly, more and more organizations are using the Web technology interconnecting themselves by means of a number of applications. In such case, the ability to develop and integrate existing applications gains a very important role.

Theoretically, each company faces, at a given moment, the problem of integrating various applications. This is explainable by the continuing evolution of information technology offered to companies. In the current economy, it is very rarely the case of companies which remain successful just by preserving their status quo. In this respect, companies are required to evolve in order to stay competitive.

For many companies, the e-Business model is a completely different and independent of the traditional model. These changes from traditional technologies to new technologies are expensive for the company and include changes on the staff level. Under these circumstances, many companies will not allow changing the existing technologies.

2. Enterprise Application Integration (EAI)
EAI offers companies the opportunity to integrate their existing applications and other systems to gain new technologies and applications from this mix.

EAI, also helps the company to achieve and automate business processes.

EAI has always focused on the companies’ IT department, integrating new models of software or existing applications.

When asked how companies managed to achieve these integration scenarios before the existence of EAI, J2EE or Connector technologies, the answer...
could be the following: companies managed to achieve such integration with great difficulty and often at very high costs. The systems were integrated by consultants and the level achieved was often unsatisfactory.

Under such conditions, there are taken into account the cost and difficulty of replacing the existing system with a new one, or the mix of the existing system with new modules.

To maximize the Web-driven Application Integration, companies focus on programming Java and the J2EE platform. In addition to Java platform, companies use XML to exchange data between applications. XML is an independent platform that transmits data and is used to transfer data between different entities. It may be said that there is a synergy between XML and Java. XML is for data what Java programming is for application services.

Before the existence of EAI, the integration of applications and data within a corporation was not easily achievable, expensive and risky. Companies were trying to combine their applications to run on different hardware platforms and did not use communication protocols with different software packages other than those defined. In this respect, companies had "fields" where business data and functions existed distinctly for every problem or field.

![Fig.1 Typical company model](image)

EAI defines semantics for applications and data. Thus EAI defines methodological standards for data and applications access to communicate. By supporting this standard, the applications can easily communicate with other applications and data. The components of integration, such as DBMS (Data Base Management System) may change, but because of the existence of such methodology, the replacement of a component may be achieved without interrupting the communication within the system.

The most important use of EAI is where the environments to be united are heterogeneous. Heterogeneous environments are those applications and data which are not similar. This happens when a company includes other companies also taking their entire internal system. This leads to the existence of a large number of users on distributed systems as well as on a multitude of platforms.

At present, company servers manage a large proportion of applications and data used by corporations. Companies have understood that it is important to be able to offer more services, such as consumer service support or product catalogs via the web.

Web-driven Application Integration made data and services to be more accessible. In this respect any access of the company servers should be done in a secure manner.

No company can afford to lose data or worse, its data integrity to be compromised in some way. Even if the company where the product is incorporated is large or small, the access to systems should be multiple. A company cannot risk using a system that will offer information to a single user in real time.

So far applications have been classified as follows:
1. Front-office applications include applications used for client interaction and marketing automation;
2. Back-office applications offer the infrastructure to run the processes “behind” a company’s activity.
The applications from an Enterprise Resource Planning (ERP) represent a good example of back-office applications. As the following figure shows the application servers and are particularly close to B2C and B2B which makes even more difficult the integration of applications. The application server helps to transactions’ handling. The following figure shows this Web direction by means of which companies are under continuous transformation.

![Diagram showing Web-driven Application Integration](image)

**Fig. 2 Web-driven Application Integration**

### 3 Enterprise Information Systems (EIS)

EIS is defined as a system of company applications that offer information infrastructure for the company. Typically, EIS is composed of several applications within a company system. An EIS offers to its users a set of services. The services offered to clients may be at different levels of abstraction, including: the system level, data level, functions’ level, the level of objects or business processes.

Graphically, this is illustrated in the figure below:

![Diagram showing The Enterprise Information Systems environment](image)

**Fig. 3 The Enterprise Information Systems environment**

In the EIS environment, the applications are on application server. The application server has a specific infrastructure, focusing especially on the transactions’ services and processes, on security, etc. The applications can be written in different languages such as COBOL, C or C++. The clients
may access various applications through APIs (Application Programming Interface).

The various applications are considered EIS systems. We may say that EIS includes:

• The company’s applications that are developed in the company to meet the requirements – they represent client applications. In particular, the applications run on different environments, using different programming languages such as C or COBOL.
• The applications that are part of an ERP system. The ERP applications cover a large range of functions, including management of inventories, production, control, human resources, logistics and supply-chain management.
• The transaction of programs working for a particular process in the system.

For various reasons, EIS differs widely from one company to another due to the following elements:

• The companies implement various EIS for a period of several years, based on the increase of their needs;
• The companies customize EIS according to their own needs.

4 EAI Access

The literature mentions several ways to access the EAI, the most important are: • use of a double client-server access; • use of synchronous adapters; • use of asynchronous adapters; • use of a server application.

4.1 The use of a double client-server access

This method is based on a double access to the client-server level and corresponds to applications which are not based on Web technology. Therefore, this method is less used.

Using this method, EIS provides an adapter in the form of an API to access EIS data and functions.

The communication between the adapter and EIS in particular, uses specific EIS protocols. These protocols can provide the support necessary to secure transactions (Fig.4).

An EIS adapter can be developed as a C library (example in Fig. 5). A Java application uses Java Native Interface (JNI), an interface used to accesses the C library or the resource adapter C.

JNI allows the Java code that runs on a Java Virtual Machine to operate with applications and libraries written in other languages such as C or C++.

![Fig.5 Use of the Java Native interface](image)

Another significant element of EIS is the ability to adapt to different models, distributed platforms and architectures.

4.2. Use of synchronous adapters

An adapter can have a synchronous or asynchronous communication between client applications and EIS. Figure 6 shows the operation of synchronous adapters.

The adapters designed for synchronous access provide a communication model application-receipt used between applications and EIS.

![Fig.6 Use of synchronous adapters](image)

A form of the synchronous adapters allows synchronous bi-directional communication between application and EIS. This type of adapter allows EIS to communicate synchronously with the application.

4.3 Use of asynchronous adapters

The asynchronous adapters offer another type of access to the level of applications’ integration. Using asynchronous communication, an application calls an isolated function that creates a new receipt item in the EIS. The application makes a call, then immediately, it return and continues the processing by itself. The isolated function is to EIS.
EIS uses the function and returns the response information to the application in an asynchronous manner.

It is important to note the application does not suspend its process while the isolated function runs on EIS.

4.4 Integration of applications at the server level

Figure 7 shows how a server application may be used to achieve the integration involving the existence of applications and EIS.

A Server application is inherently a starting point for applications’ integration, as providing a platform for development and management based on Web applications. The operations servers are platforms developed using multiple architectures.

In particular, an application server offers a set of services in developing the components. These services include: • Support of transactions; • security; • access to database; • asynchronous messages; • distributed communications; • Web portals; • XML support.

5 Conclusions

Before the existence of EAI, the integration of applications and data within a corporation was not easily achievable, expensive and risky. Companies were trying to combine their applications to run on different hardware platforms and did not use communication protocols with different software packages other than those defined. In this respect, companies had "fields" where business data and functions existed distinctly for every problem or field.

Now, with the help of EAI it can offers to the companies the opportunity to integrate their existing applications and other systems to gain new technologies and applications from this mix. EAI, also helps the company to achieve and automate business processes. In this way, EAI has always
focused on the companies’ IT department, integrating new models of software or existing applications.

The most important use of EAI is where the environments to be united are heterogeneous, i.e. are those applications and data which are not similar.

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